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SHAKESPEARE AND PRECIOUS STONES.

Shakespeare and Precious Stones. By Dr. G. F. Kunz. Pp. 101. (Philadelphia and London: J. B. Lippincott Co., 1916.) Price 6*s*. net.

THE author of this contribution to the literature of the Shakespeare Tercentenary has long been known as the most prominent expert authority on gems and jewelry in the United States. He has acquired a wide knowledge of the various sources of origin of precious stones from the earliest times up to the present day, and is familiar with the pedigree of every jewel which has made itself famous among the generations of mankind. It was fitting, therefore, that, among the various essays in connection with the Shakespeare celebration last year, Dr. Kunz should discourse on the knowledge which the great dramatist possessed of precious stones. He has compiled a daintily printed volume in which he has collected all the poet's references on this subject, and he adds comments on the probable sources from which the gems of Elizabethan and earlier, as well as later, times have been obtained. His reverence for the memory of Shakespeare has led him to make all his quotations from the First Folio of 1623—an affectation which, with no compensating advantage, gives his readers a little additional trouble in finding the passages cited. The number of those who can refer to the First Folio must be extremely limited, even in New York.

It was inevitable that Shakespeare should be much less familiar with precious stones than with the living things of natural history of which he has made so much use. At Court functions and entertainments by the leaders of society he must have seen, at least from a distance, great ladies "walled about with diamonds," or "decked with diamonds and Indian stones." It is to the distant sheen and glitter of the gems that he usually alludes in his plays and poems, rather than to their individual character when seen close at hand. He refers, for instance, more than twenty times to the diamond, without much indication that he knew what was the special quality which has given that gem its deserved pre-eminence. Out of the seven references to the diamond in "Cymbeline," there is only one where this distinctive quality is recognised—"that diamond of yours outlustres many I have beheld."

The names of the gems are often used by the poet as adjectives of colour, and with no reference to the other qualities of the stones. Thus in the only mention of the emerald in the Plays the name is simply a synonym for green. Mrs. Quickly tells her fairies to

> write
> In emerald tufts, flowers purple, blue, and white.

The ruby also is chiefly used as a colour-epithet, applied more especially to lips and cheeks. This gem is introduced, however, with delicate effect into the fairy world, where around the queen

> The cowslips tall her pensioners be;
> In their gold coats spots you see:
> These be rubies, fairy favours.

The jewel most often alluded to by Shakespeare is the pearl, which he mentions upwards of thirty times. Yet in no single passage does he, by a descriptive epithet, indicate the peculiar kind of beauty which has made this gem to be so prized in every age. One of his favourite similes is to compare tears to pearls. When Proteus in "The Two Gentlemen of Verona" was banished, his Silvia was said to have poured forth on his behalf "a sea of melting pearl, which some call tears." Again, when Cordelia in "King Lear" heard of the indignities put on her father, her eyes filled with tears,

> which parted thence
> As pearls from diamonds dropp'd.

Another comparison of which the poet makes effective use is to liken dewdrops to pearls, and nowhere with more exquisite delicacy than in his fairy world, where it is one of the functions of the fays to

> seek some dewdrops here,
> And hang a pearl in every cowslip's ear.

Further, when Oberon saw the garlands with which Titania had bedecked the hairy scalp of the transformed Bottom, he could not but exclaim:

> That same dew, which sometime on the buds
> Was wont to swell, like round and orient pearls,
> Stood now within the pretty flowerets' eyes,
> Like tears, that did their own disgrace bewail.

There is an allusion to the origin of the pearl in "As You Like It," where, among his sententious remarks, Touchstone tells the Duke that "rich honesty dwells like a miser, sir, in a poor house; as your pearl in your foul oyster." Dr. Kunz, on rather slender grounds, is inclined to believe from this passage that the poet may have been acquainted with some of the repulsive details of the pearl fishery.

Shakespeare could sometimes put the names of precious stones to a contemptuous purpose. In "The Comedy of Errors" we hear of a kitchen-wench who had a "nose, all o'er embellished with rubies, carbuncles, sapphires"—a portraiture which in later days was imitated by a Scots ballad-monger, who wrote that

> many a Cairngorm pimple
> Blazed upon the face of Kate Dalrymple.

It is seldom that Shakespeare's references to gems indicate that he was probably making use of his own personal acquaintance with them. Perhaps the best example of this knowledge occurs in "Twelfth Night," where the Clown, in taking leave of the Duke, exclaims: "Now the melancholy god protect thee; and the tailor make thy doublet of changeable taffeta, for thy mind is a very opal." The singular variability of colours in this stone as it is turned round in the light makes it a good illustration of mental vacillation.

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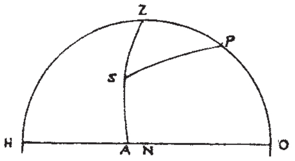
Dr. Kunz cites, among the precious stones mentioned by Shakespeare, a number of substances which, though they can scarcely be reckoned precious, have long been employed in jewelry, such as agate, amber, coral, jet, and rock-crystal. His little volume, though without literary distinction, contains much information on the subject of which it treats, and will be welcomed by lovers of the great dramatist.

IDENTIFICATION OF STARS.

Star Identifier and Diagrams for the Graphical Solution of Problems in Nautical Astronomy. By J. E. McGegan. (London: The London Name Plate Manufacturing Co., and J. D. Potter, 1916.) Price 10*s*. 6*d*. net.

BY the pamphlet and diagrams prepared by Mr. McGegan he suggests a method by which, when an observer has taken an altitude of a star the identity of which is doubtful, he can, if he also observes the compass bearing of the object at the same time, ascertain its declination and right ascension, and thus identify it in the Nautical Almanac.

The problem is very simple, provided the data can be accurately observed, as the annexed diagram will show: where P is the pole, Z the zenith, N the place of the observer, H O the horizon, while S is the star observed which requires to be identified. The arc S A will be its altitude, the arc P O the latitude of the observer. Consequently, the arc Z S will be its zenith distance, and the arc P Z the colatitude, whilst the angle P Z S will be its azimuth, which can be obtained by correcting the compass bearing observed to the true bearing, and then deducting the result from 180° to find the azimuth. There is consequently a spherical triangle P Z S, with two sides and the included angle known, to find the third side P S (the polar distance) and the angle Z P S (the hour angle). By applying the hour angle to the right ascension of the meridian of the place, readily ascertained from the Nautical Almanac, the right ascension of the star is obtained and its declination from its polar distance.



To solve the problem without much calculation Mr. McGegan has ingeniously constructed two diagrams on equal scales, one the diagram of a hemisphere divided into circles of declination from the equator to both poles; and into meridians representing sidereal hour angles, or circles of right ascension; a second diagram on celluloid, which is transparent, represents a semicircle marked in circles of altitude from the horizon to the zenith, and of arcs of azimuth 0° to 90° east and west from the meridian.

There is, in addition, on the diagram of right ascension and declination a quadrant at the side marked from 0° to 90° to represent latitude.

Now if the position of the star by altitude and azimuth be marked on the celluloid semicircle, and the semicircle be placed over the diagram of the hemisphere in such a manner that its centre coincides with the centre of the hemisphere, and its horizon cuts the quadrant marked outside the hemisphere at the latitude of the observer, then the position on the celluloid will show on the diagram of the hemisphere under it the declination and hour angle of the star to be identified.

In actual practice this is seldom, if ever, necessary. Star observations at sea are only of use when the horizon is clear and well defined—for instance, at twilight morning or evening, or when Venus or Jupiter passes the meridian at an interval of more than 2½ hours from noon. When the horizon is well defined the stars are nearly always too faint to enable compass bearings of them to be observed.

Stars on or near the meridian can at twilight nearly always be seen through the sextant, when invisible to the naked eye, if their approximate altitude be placed on the sextant. For longitude only very bright stars are available at twilight, and navigators know well where they are situated and where to look for them.

As the celluloid semicircle easily slips out of its place over the diagram of the hemisphere, it would be an advantage if a screw-pin were placed through the centres of both with a clamp and screwed tightly, when the horizon line had been placed on the appropriate latitude on the side of the diagram of the hemisphere.

AN ARABIC ALGEBRA.

Compendio de Algebra de Abenbéder. Texto árabe, traducción y estudio por José A. Sánchez Pérez. Pp. xlvii+117. (Madrid: E. Mastre, 1916.)

THIS work is "a compendium of algebra composed by the sheikh Abu Abdullah Muhammad b. 'Umar b. Muhammad, generally known as Ibn Badr." Practically nothing is known about the author, and not much about the date of the treatise. The MS. on which this edition is based was written in A.H. 744 (=A.D. 1343), and the text contains a reference to Abu Kāmil (trans. p. 57, text p. 39) and "his book about algebra." The editor takes this Abu Kāmil to be Abu Kāmil Shujaʿ b. Aslam al-Ḥāsib (the reckoner). The treatise comprises a theoretical part and a collection of problems, or rather a set of numerical examples of particular types, followed by problems relating to practical affairs of commerce, etc. The theoretical range includes (in this order) quadratic equations, quadratic surds, law of integral indices, rule of signs for multiplication (given without any comment), multiplication of ordinary polynomials, division of one monomial by another, rule of transposition. Among the problems we have cases of simultaneous equations of various kinds; and it is clear (p. 70) that the author was acquainted with the arithmetical theory of proportion.

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